

# The Ergonomic Standard in Ultrasonic Care.

How NEWTRON® Piezo Technology Protects Hygienists and Enhances Patient Care

## EXECUTIVE SUMMARY

Dentistry faces a workforce crisis, with hygienist shortages, burnout and musculoskeletal injuries threatening the profession. Scaling procedures — among the most physically demanding tasks — expose clinicians to uncontrolled vibration and repetitive strain, leading to conditions such as hand-arm vibration syndrome (HAVS) and carpal tunnel.

NEWTRON® Piezo scalers represent a clinically advanced solution, offering precise linear vibration, ergonomic design and real-time power control that protects clinicians, reduces injury risk and enhances patient comfort.

More than a technology upgrade, Piezo is part of a broader shift toward prioritizing wellness in dentistry — supporting professionals with tools that sustain long, healthy careers while elevating patient care.

## AN INDUSTRY UNDER PRESSURE

The dental profession is confronting a growing workforce crisis. According to the American Dental Association (ADA), staffing shortages remain one of the top challenges for practices in 2024.

DentalPost's most recent [Dental Professional Salary Survey](#) underscores the instability: **More than one in three dental professionals (36%) are considering leaving their current jobs within the year.**

This shortage is not the result of a single cause but a perfect storm of pressures. The lasting impact of the COVID-19 pandemic, mass retirements and an exodus of professionals from the field have all thinned the workforce. At the same time, patient demand for care continues to rise, while the number of new professionals entering the pipeline cannot keep up.

Dentistry depends on highly skilled professionals with specialized training. These positions are not easily replaced, and vacancies directly impact productivity, patient access and the financial health of practices. Every open role represents lost capacity and increased strain on remaining staff — making workforce stability one of the most pressing challenges in dentistry today.



**More than 1 in 3 dental professionals are considering leaving their current job within the year.**

# Common Conditions Of Chronic Overuse & Repetitive Stress



TENDONITIS



NERVE DAMAGE



OSTEOARTHRITIS



HAND-ARM VIBRATION SYNDROME (HAVS)



## MEET CAITLIN PARSONS, RDH + KELLY TANNER, PH.D., RDH

Behind the statistics are real people whose lives and careers have been shaped by the toll of occupational pain. Caitlin Parsons, RDH, and Kelly Tanner, RDH, PhD, are two hygienists who nearly left the profession early in their careers due to physical strain.

For Caitlin, the pain began almost immediately after entering the field. *"It started in my left neck and shoulder. Like a lot of dental professionals, it slowly crept in. I got to a really low place and almost quit dental hygiene, and was looking into alternative careers at 20 to 23 years old."*

Dr. Kelly Tanner faced a similar crossroads. *"I had to stop teaching and practicing for a while because this position was sending pain down my arm. I had to actually take myself out of clinical teaching because I couldn't take it until I healed."*

Their experiences reflect the reality for many hygienists — dedicated professionals pushed to the brink by the physical demands of their work. What makes Caitlin and Kelly unique, however, is the path they chose forward. Rather than walking away, they committed themselves to helping other hygienists thrive.

Today, both are leaders and advocates, using their stories to shine a light on the risks of pain and burnout while championing solutions that protect clinicians and enable long, fulfilling careers.

## OCCUPATIONAL PAIN

Workforce shortages are only part of the challenge. The physical demands of the job take a heavy toll even for those just entering the profession. In fact, **91% of dental hygienists report experiencing work-related pain**, underscoring just how widespread the issue has become.

Musculoskeletal strain and burnout are driving many clinicians to scale back their hours, change careers, or retire early — further compounding the staffing crisis. At the heart of the problem is scaling — a repetitive, physically demanding procedure — which fills much of a hygienist's day.

As hygienists work, they often find themselves in awkward or sustained body positions. Scaling requires significant grip strength and exposes clinicians to continuous vibration, increasing strain on the hands and forearms.

Over time, these demands can lead to tendonitis, osteoarthritis, nerve damage and hand-arm vibration syndrome (HAVS), a progressive condition marked by numbness, tingling and reduced dexterity. Worn or dull tips only magnify the effort required, making scaling harder for both hygienist and patient.

## PROTECTING THE BODY & PREVENTING BURNOUT

Caitlin Parsons, RDH and Kelly Tanner's, PH.D, RDH experiences highlight an important truth: pain often begins early in a hygienist's career, but its effects compound over time.

Without intervention, the daily strain of practice can lead to chronic injury, disengagement and ultimately burnout. Protecting the body — and the career — requires intentional choices throughout the day, not a single solution.

A pain-free practice is built from many small but meaningful actions:

- **Posture and positioning:** Maintaining neutral body alignment and using proper ergonomics reduces strain on the neck, back and shoulders.
- **Loupes and saddle chairs:** High-quality magnification and seating support better posture and minimize fatigue.
- **Cord management:** Tools such as Cordeze can help reduce the pull and weight of cords, relieving stress on the arms and wrists.
- **Combatting vibration:** Addressing the hidden stressor of vibration is critical. Newtron® Piezo technology and fresh tips significantly lower harmful vibration exposure while reducing the effort required during scaling.
- **Movement beyond the operatory:** Staying active outside of work helps strengthen muscles, improve flexibility and protect against repetitive strain.
- **Mental engagement:** Staying connected to one's purpose and the "why" behind patient care helps mitigate the psychological effects of stress and pain.
- **Instrument upkeep:** Regularly replacing and maintaining tips ensures that procedures are efficient and less taxing for both the clinician and the patient.

No single adjustment can eliminate the physical demands of hygiene, but together these strategies create a more sustainable path. By combining better ergonomics, healthier habits and advanced tools like Piezo scalers, hygienists can protect their bodies, preserve their passion for the profession and continue delivering excellent patient care for years to come.

# The Science of Vibration

## PIEZO VS. MAGNETOSTRICTIVE

At the core of ultrasonic scaling is vibration. The way scalers produce vibrations makes all the difference for both clinicians and patients.

How they work:

- Magnetostrictive scalers:** Traditional magnetostrictive scalers use older technology that generates an elliptical, multi-directional motion. This chaotic tip movement activates all surfaces of the instrument, creating more heat and requiring nearly twice as much water for cooling.
- Piezoelectric scalers** (e.g., Newtron®): Piezoelectric scalers use a newer generation of ultrasonic technology that creates a linear, back-and-forth tip motion, so only the lateral surfaces of the tip are active. This linear motion produces less unintended heat and tends to require less water flow compared to magnetostrictive units, which can contribute to reduced aerosol dispersion.



## COMPARISON OF ULTRASONIC SCALERS

	MAGNETOSTRICTIVE	PIEZOELECTRIC
FREQUENCY	20 - 40 kHz	25 - 50 kHz
STROKE PATTERN	Elliptical 	Linear 
MOVEMENT PATTERN	Chaotic	Controlled
POWER DISPERSION	All surfaces active	Only active on lateral sides

## HAVS AND CLINICIAN SAFETY

Hand-Arm Vibration Syndrome (HAVS) is a serious occupational risk for dental professionals. Magnetostrictive scalers' elliptical motion **generates multi-directional forces** (up, down, side-to-side), which are transmitted into the clinician's hand, wrist and forearm. Over time, this increases the risk of nerve damage, reduced dexterity, and symptoms such as tingling, numbness, or even Raynaud's phenomenon.

Piezo, by contrast, produces a **linear motion on a single axis**. This means vibrations are more controlled, reducing random stress on the hand and arm. While no device is risk-free, Piezo significantly lowers long-term exposure to multi-directional forces — helping protect hygienists from the cumulative effects of vibration.

### How Newtron® Piezo protects hygienists and dentists

- Controlled linear vibrations** reduce strain and vibration exposure.
- Real-time power modulation** automatically adapts output to the load on the tip, preventing unnecessary force.
- Ergonomic handpiece design** — lightweight, slim, and titanium-balanced — further eases muscle fatigue.

## CLINICAL COMPARISONS

- Tissue preservation:** Newtron® Piezo's precise motion is gentler on tissues and preserves tooth surfaces with perfect linear vibrations.
- Patient comfort:** Multiple studies report that patients find Piezo scaling less painful and less noisy, improving their overall experience.



## Comparing Ultrasonic Scaling Technologies

	MAGNETOSTRICTIVE	PIEZOELECTRIC (NEWTRON®)
VIBRATION PATTERN	Elliptical, multi-directional, chaotic	Linear, back-and-forth tip motion, controlled
HEAT & WATER USE	Generates more heat; requires ~2x more water	Produces less heat; uses up to 50% less water (reduces aerosols)
TISSUE PRESERVATION	Higher risk of soft tissue trauma	Greater control; safer on tissues
PATIENT COMFORT	Louder, more vibration, often reported as more painful	Quieter, less vibration, consistently rated more comfortable
HAVS RISK	Higher: multidirectional forces increase stress on hand/arm	Lower: linear motion reduces random vibration exposure
ERGONOMICS	Bulkier handpiece, heavier cord pull	Slim, lightweight, titanium-balanced design
EFFICIENCY & CONTROL	Less adaptable, manual power adjustment	Real-time power modulation adjusts automatically to tip load
TIP VARIETY	Limited range, hygiene-focused	Multiple functions (hygiene, endo, restorative, etc.) 60+ color-coded tips that allow hygienists to quickly color to their desired level of power output

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*The Piezo handpiece is comfortable to hold, and causes less stress in my hand and muscles in my neck and shoulder.*

**Kelly Tanner, Ph.D., RDH**

# A Better Patient Experience

While Piezo technology protects clinicians, it also enhances the patient experience. The differences are noticeable: less water spray, a quieter procedure, smoother instrumentation and greater comfort throughout treatment.

For patients, comfort is more than a luxury — it is central to trust and compliance. By reducing vibration and water spray, piezo scalers enable clinicians to devote their full attention to patients.

*I have a lot of elderly patients, and using less water for their comfort is really nice.*

Caitlin Parsons, RDH

## KEY BENEFITS TO PATIENTS

- **Preservation of teeth and tissue:** Controlled linear vibrations deliver precise and gentle treatments, while specialized, medical-grade, steel tips protect enamel and anatomy.
- **Maximum efficacy:** Real-time power modulation ensures consistent performance with no added pressure, while cavitation at the tip's extremity fragments and eliminates deposits.
- **Efficiency and visibility:** Reduced water spray improves visibility in the operatory and enhances patient comfort.
- **Customization for every case:** With more than 60+ specialized tips, Piezo technology offers safe, effective solutions for a wide range of needs — including tips that are safe for use on implants.

*Anytime we're not focused on how our body feels or a nagging ache, the more we can focus on our patient.*

Caitlin Parsons, RDH

## PRECISION TIPS TAILORED TO EVERY PATIENT

Piezo scalers don't just make treatments easier for clinicians, they create a better overall experience for patients — one that is gentler, safer and more efficient. A difference that builds trust, improves satisfaction, and supports long-term loyalty.

## ULTRASONIC TIPS DESIGNED FOR:

- **Prophylaxis**
- **Periodontics**
- **Implant maintenance**
- **Endodontics**
- **Prosthesis**
- **Restoration**

*When we're thinking about the pathogens that are in the pocket, there's a therapeutic benefit of using an ultrasonic scaler, especially in those pockets and the areas that are deeper. We're also using the ultrasonic handpiece to reduce our repetitive motions.*

Kelly Tanner, Ph.D., RDH



## CONCLUSION

# Scaling Smarter for a Sustainable Profession

### SHAPING THE FUTURE OF DENTISTRY

The evolution of dental hygiene depends on more than addressing today's challenges — it requires an ongoing commitment to research, innovation and education. While current evidence strongly supports the role of Piezo technology in reducing harmful vibration and improving ergonomics, more longitudinal studies are needed to fully understand how these advances can prevent musculoskeletal conditions like HAVS over the course of a career.

At the same time, manufacturers continue to refine and expand Piezo technology, developing new tips, handpieces and complementary products that further enhance safety and efficiency. As these innovations move from research into practice, clinicians will gain even more tools to protect their bodies while improving patient outcomes.

Equally important are the resources that help hygienists adopt and sustain healthier habits in daily practice. Podcasts, continuing education courses, and practical e-guides provide valuable strategies for ergonomics, wellness and tool optimization. Together, these resources support a broader shift toward a profession where wellness is central to clinical excellence.

***Ultimately, building a sustainable profession starts with protecting the people who make it possible. Safeguarding hygienists today ensures the future strength of dentistry.***



### SUPPORTING RESEARCH

- A vibrometry study showed that magnetostrictive scalers (e.g., Cavitron) generate greater multidirectional mechanical energy, increasing the likelihood of hand-arm transmission.  
Source: ResearchGate
- Another study (MDPI, 2023) linked instrument use frequency and duration directly to increased neurological and musculoskeletal complaints in dental professionals.  
Source: MDPI
- In a comparative study (Ikeda et al., 2021, Int. J. Dent. Hyg.), patients reported significantly less discomfort and vibration with piezoelectric scalers versus magnetostrictive devices. Similarly, a vibrometry study (ResearchGate, 2023) found magnetostrictive units generate greater multidirectional mechanical energy, increasing the likelihood of hand-arm transmission.  
Source: ResearchGate

### ERGONOMICS AND INNOVATION FOR LONG-TERM WELLNESS

The crisis is real — pain, early retirements, shortages and burnout are reshaping the future of dentistry. There is no single solution. Just as diet, exercise and mental health all contribute to overall wellness, sustaining the dental workforce requires a combination of ergonomic practices, the right mindset and smarter tools.

Piezo technology is a critical part of that solution. By protecting clinicians from vibration-related injuries, reducing daily strain and enhancing patient comfort, it offers a practical way to ease today's burdens while building a healthier tomorrow.



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